33 Ogilvie Road
Mount Pleasant. 6153
11 December 2017

Mr Lincoln Flindell
Economic Regulatory Authority
4th Floor Albert Facey House
469 Wellington Street, Perth

Dear Sir

Submission on Western Power's AA4 Proposal

I refer to the invitation to make submissions regarding Western Power's AA4 Proposal, submitted to the ERA on 2 October 2017. I enclose my submission.

I am writing this submission in my capacity as a member of the Western Australian public, and as an electricity customer using Western Power's network. My perspective is shaped from my experience at SECWA in the late 1980s and early 1990s, when I was involved in developing tariff policy and undertaking cost of service studies to assist in setting Western Australia's electricity and gas tariffs. I was also directly involved in the design and implementation of the major electricity tariff restructuring program from 1992 to 1994.

This submission specifically focuses on the current tariff structures of Western Power's proposed distribution network tariffs as covered in Issue 4, Issue 11 and Issue 12 of the Issues Paper on Proposed Revisions to the Western Power Network Access Arrangement (2017/18 to 2021/22 - AA4) published by the Economic Regulation Authority on 31 October 2017. Issue 22 is also touched upon.

Western Power's 2017/18 Price List information did not to include Any Time Maximum Demand (ATMD) kVA estimates for the network customers or tariff groups and did not provide the break-down of network cost types by customer groups, as was provided in the 2016/17 Price List Information. This information is essential for any third party to undertake any meaningful analysis of Western Power's costs and distribution networks. I suggest that this information, missing from the 2017/18 Price List, be made available in relation to future Western Power proposals.

In the absence of the required information in the 2017/18 Price List Information, I have used the 2016/17 Western Power Price List Information for my analysis. Given that there is not a significant difference in the electricity network cost and data between the two years, I believe this analysis and the rates produced are still valid. I have included a spreadsheet supporting my analysis with my submission.

My submission, which follows, starts with the main focus of my submission, an Executive Summary of the individual issues, followed by more detailed discussion of the Issues and a Conclusion and Recommendations section.

Thank you for the opportunity to make this submission, and I look forward to the discussion it may generate.

Yours Faithfully

Craig Hosking

Submission to the ERA Regarding Western Power's AA4 Proposal

Author: Craig Hosking
Date: 11 December 2017

The Elephant in the Room

There is an "elephant in the room" which no-one seems to be talking about.

The "elephant in the room" is that Western Power's network tariffs, applied to most electricity customers, charge kWh energy rates rather than $/kVA demand rates, which better reflect network costs.
These kWh energy based network tariffs result in economic inefficiencies in the electricity supply system and cross-subsidies between customers, because they do not match the network cost structure.

The Western Power network tariffs were designed around 2006 and were first published for the 2007/08 year. The network tariff structures have hardly changed since then. The tariffs were designed in a time when solar PV (Photovoltaic) systems and other customer technologies were very expensive and not extensively deployed. These customer technologies therefore had very little impact on customer network electricity consumption. Western Power's network tariffs also followed the tariff structures of Eastern States network companies, who were usually also retailers, in the National Electricity Market.

We are now at the cross roads in the electricity industry. New, affordable technologies make it possible for residential and business electricity customers to produce, store and sell electricity, in addition to their traditional practice of purchasing electricity via the Western Power network.

Companies are developing phone Apps for customers to trade solar electricity production between retail customers. Micro grids, with and without full network backup, are on the drawing board. Customers are demanding more information about their electricity costs so they can control them. It is now more important than ever for Western Power to set its network tariffs to match as closely as possible the way its network costs are incurred, so customers and businesses can make their choices with the correct network cost information. This requires the network tariffs to be set with $/kVA demand rates, rather than kWh energy rates.

By using kWh energy rates for the network tariffs, Western Power is promoting that retailers and customers reduce their network kWh consumption, even when there is no reduction to network kVA demand, which is the primary incremental network cost driver. This mismatch between network prices and costs leads to economic inefficiencies in the electricity supply system and cross-subsidies between network electricity customers.

Western Power should recast the network tariffs to properly reflect the actual network cost structure ie $/customer per annum and $/kVA per annum demand. Prior to recasting the network tariffs, Western Power should re-examine its Fixed ($/customer per annum) verses Variable ($/kVA per annum) allocation to the distribution cost groups, especially considering the weighting of Western Power's line and underground cable assets and their true Fixed verses Variable (incremental) cost nature.

Practically, Western Power is able to restructure its distribution network tariffs fairly easily, because it only sells to retailers and not directly to the distribution electricity customers. For electricity customers without kVA demand metering, Western Power can use the customer group any time maximum demand (ATMD) to determine the appropriate $/kVA rate to be applied and thereby the total aggregated charge to apply to each retailer, depending on their customer types.

Thus Western Power's revenue would remain the same, retailers would receive the right cost signals to develop retail tariffs that closely matched the network cost drivers, and electricity customers would be encouraged to examine ways and technologies for reducing their network peak kVA demand. This would give a Win-Win result for everyone. An additional impact of moving to kVA demand based network tariffs is that Western Power's plan to deploy as standard, new electronic meters that measure customer kVA demand would be assured.

Western Power has an important role to play in the rapidly changing electricity industry, and so it is extremely important that it provides network tariffs that match as closely as possible the way the network costs are incurred.

Western Power's kWh energy based network tariffs are problematic. I hope we can start talking about this "elephant in the room" and develop a plan to remove it.

Executive Summary

With regard to the ERA Issues Paper, Submissions are invited from interested parties on:

> ***" Any other tariff developments considered necessary to meet the Code requirements."* (Issue 4 -4) and *"Western Power's proposed tariffs"* (Issue 12)**

1. Western Power's current network tariff structures which use kWh energy charges rather than $/kVA demand charges do not comply with:
    a. The Network Access Code's primary objective (Section 2.1) to promote economic efficiency;
    b. The Network Access Code's objectives of pricing methods (Section 7.4(a)); and
    c. Western Power's 2016/17 pricing principles of equity.

   This analysis is undertaken in Section 1.

2. Western Power should explicitly show its customer group network costs based upon its stated cost structure of $/customer per annum and $/kVA per annum demand. This would show customers and retailers the true nature of network costs. This analysis is undertaken in Section 2.

With regard to Issue 4 (dot point 3) of the ERA Issues Paper, Submissions are invited from interested parties on *"The balance between fixed and variable charges"*.

3. Western Power should recast their network tariffs to properly reflect the actual network cost structure, with its Fixed $/customer per annum and Variable $/kVA per annum demand components. Prior to recasting the network tariffs, Western Power should re-examine its allocation of network distribution cost groups between Fixed and Variable components. An analysis of the Fixed and Variable cost components for underground HV cables is shown. The network tariffs for customer groups are developed using a 70% Fixed and 30% Variable cost allocation, which is compared with the existing Fixed/Variable cost allocation, as shown in Section 3.

With regard to Issue 4 (dot point 2) of the ERA Issues Paper, Submissions are invited from interested parties on *"The proposed new time of use and demand tariffs"*.

4. Western Power should not be introducing new network tariffs, such as its proposed new time of use energy (RT17 and RT18) and time of use demand (RT18 and RT19) tariffs, which still have significant kWh energy charges, when there is no network cost difference between them and the existing network tariffs. Western Power should be looking at reducing the number of tariffs, not increasing them. Western Power's role is to charge retailers network tariffs that match as closely as possible to the way the network costs are incurred. This discussion is expanded on in Section 4.

With regard to Issue 22 (dot point 3) Submissions are invited from interested parties on:

> ***"whether any revisions are needed in addition to those proposed by Western Power."***

5. Western Power should take responsibility for the impact its network tariffs have on electricity retailers and electricity customers. Any additional costs imposed on electricity retailers because the kWh based network tariffs do not reflect the network costs, should be deducted from Western Power's approved revenue and rebated to electricity retailers. The analysis in Section 5 shows that Western Power's approved revenue should be reduced by $50m due to the impact of residential customers installing solar PV, and rebated back to electricity retailers.

1. Non-Compliance of Network Tariff kWh Energy Rates with the Electricity Networks Access Code and Western Power's Pricing Objectives

The objective of the Electricity Networks Access Code, the "Code objective" as specified in Section 2.1, is to "promote the economically efficient investment in, and operation and use of, networks and services of networks in Western Australia in order to promote competition in markets upstream and downstream of the networks."

Economic efficiency can be defined as "a state where every resource is allocated optimally so that each person is served in the best possible way and inefficiency and waste are minimized."

Western Power's network tariffs, which use kWh energy rates, do not comply with the "Code objective" because they do not promote economic efficient investment in the network and they distort the upstream market of electricity generation and the downstream markets of retailing grid electricity and the market for customer technologies such as solar PV and battery storage.

Western Power states that its costs are primarily driven by network electricity kVA demand and not by network kWh energy usage, and that energy is used as a proxy for demand due to the majority of customers not having metering which measures demand. There is no proportional relationship between a customers' network kWh energy usage and a customer's network kVA demand, especially with the now affordable solar PV and battery storage technologies. Because the kWh energy based network tariffs do not match the main cost driver for the network (kVA demand) they cannot produce economically efficient outcomes.

Western Power's kWh energy based network tariffs do not meet the "Code Objective" because they do not encourage retailers and their customers to reduce their network kVA demand. This will lead to Western Power over-investing in network capacity because customers will not examine alternatives which could reduce their network kVA demand and thereby reduce network investment over the medium term.

The current kWh energy based tariffs encourage retailers and customers to invest in technologies which reduce network metered kWh energy usage (eg by installing solar PV) , irrespective of them reducing their peak network kVA demand. There is no economic value to the network of a customer's solar PV system, where the customer's peak kVA demand remains unchanged. The value of the solar PV electricity production is only the avoided fuel cost of large generators supplying the network.

Western Power's kWh energy based network tariffs indicate to retailers and their customers that the long term value of solar PV electricity is higher that it is actually worth. This therefore encourages investment in solar PV beyond its economic value and as such leads to economic inefficiency. This economic over-investment in solar PV will also lead to an economic under-investment in the upstream gas and coal markets supplying large conventional generators and even large renewable electricity generators, and again this leads to economic inefficiency.

People are examining the economics of customer technologies such as batteries and energy trading platforms, on the basis of the current retail electricity tariffs and the Western Power network tariffs that feed into them. For example, batteries, used in conjunction with solar PV, are being promoted to reduce a customer's network energy consumption, rather than reducing the customer's peak network kVA demand. Again, the kWh energy based network tariffs lead to further economic inefficiency in the overall electricity system.

The Electricity Networks Access Code Chapter 7- Pricing Methods, Section 7.4(a) states that:
The pricing methods in an access arrangement must have the objective that: *"the charges paid by different users of a reference service differ only to the extent necessary to reflect differences in the average cost of service provision to the users."*

This is restating part of the classic Equity principle, which is to ensure customers with the same cost characteristics, even though they may differ in other characteristics, are charged the same amount and not unfairly discriminated against.

Also in the successive Western Power Price List Information publications up to 2016/17, the Pricing Principles Overview section expanded on this Equity principle.

In the 2016/17 Price List Information publication, Section 2.2.4 states:

" Prices signal the economic cost of supply provision in that they:

a) Avoid cross subsidies between classes of service: and

b) Avoid subsidies between customers within each class of service."

The current kWh based network tariffs fail the Equity principle, because two identical customers with the same network cost characteristic, ie same network kVA demand, but with significantly different network kWh consumptions would pay different network charges. This would lead to a cross-subsidy from the customer with the higher network kWh consumption to the customer with the lower network kWh consumption. Thus the kWh based network tariffs do not meet the Access Code's Pricing Methods Objectives Section 7.4 (a) or Western Power's 2016/17 Equity principle.

The absence of the fundamental principle of Equity in Western Power's 2017/18 Price List Information, Section 2 Pricing Principle Overview, does raise the question as to whether Western Power is committed to charging customers fairly for their network services.

Ultimately the Access Code Objective, elements of the Code's Pricing Methods requirements, and parts of Western Power's Pricing Objectives, past and present, can only be met by setting cost reflective network tariffs that match the way in which customers impact on network costs. Therefore, the network tariffs should be constructed with only $/customer and $/kVA demand charges.

2. Distribution Network Costs ($/kVA/annum based) Compared with Current Implied Network Tariffs (Cents/kWh based)

Western Power determines its network costs for specified customer groups based on a cost structure of $/customer per annum and $/kVA per annum demand. Western Power however does not publish this to explain to customers the cost drivers for the network, but jumps straight to network tariffs where Cents/kWh energy usage is used as a proxy for $/kVA per annum demand cost. Western Power should publish its customer group network costs based upon its stated cost structure of $/customer per annum and $/kVA per annum demand. This would show customers and retailers the true nature of network costs.

Unfortunately, Western Power did not publish a breakdown of its allocated network costs by customer group in the 2017/18 Price List Information publication, as it has done for many years. This does not promote transparency of Western Power's derivation of its network tariffs. I have had to use the 2016/17 Price List Information to derive the kVA demand based network cost structure for the customer groups as shown in Table 1. This is then compared with the kWh based network tariffs for the customer groups, determined from the provided network cost and customer group information.

The derived network cost rates and the implied network tariff rates are equivalent as they produce the same revenue requirement for each customer group, as shown in the spreadsheet supplied with my submission.

Table 1 : Distribution Network Costs ($/kVA/annum) verses Current Network Tariffs (Cents/kWh)

Distribution Network Costs Verses the Implied Network Tariffs For Customer Groups Used in the Distribution System Cost of Supply

Based on Western Power's 2016/17 Price List Information

	Network Costs (Using $/kVA/yr)		Implied Network Tariffs (Using Cents/kWh)	
Customer Groups	Dist Total Fixed $/Cust/yr	Dist Total Variable $/kVA/yr	Dist Total Fixed $/Cust/yr	Dist Total Variable Cents/kWh
Unreads	$ 200.91	$ 300.00	$ 200.91	4.55
Streetlights	$ 126.91	$ 178.79	$ 126.91	4.21
Residential	$ 261.90	$ 223.33	$ 261.90	8.24
Small Business	$ 367.13	$ 217.86	$ 367.13	8.08
General Business -Small	$ 571.12	$ 215.34	$ 571.12	10.63
General Business -Med	$ 1,072.56	$ 207.14	$ 1,072.56	9.01
General Business-Large	$ 1,452.28	$ 153.53	$ 1,452.28	5.89
LV >1000kVA	$ 31,200.00	$ 147.02	$ 31,200.00	6.55
HV less that 1000kVA	$ 3,448.28	$ 103.17	$ 3,448.28	2.53
HV > 1000kVA	$ 72,151.90	$ 52.37	$ 72,151.90	1.56
Average	$ 265.65	$ 179.70	$ 265.65	6.63

These distribution network costs with $/kVA per annum demand rates should be the basis for the network tariffs instead of the current network tariffs with Cents/kWh rates, because they most appropriately reflect network costs.

3. Implementation of $/kVA Demand Network Tariffs and Adjustment of Fixed verses Variable Cost Components

Western Power should recast all the distribution network tariffs to properly reflect their actual cost structure of $/customer per annum and $/kVA per annum demand. Western Power should eliminate the Cents/kWh rates in the distribution network tariffs.

Prior to restructuring the network tariffs, Western Power should re-examine the allocation of total distribution costs between Fixed ($/customer per annum) and Variable ($/kVA per annum) for all network cost groups. The key consideration from an economic efficiency view point is to determine the incremental variable cost, which is the network cost that customers can influence by their actions over the medium term.

In Western Power's 2016/17 network cost breakup. a large Administration cost was determined, which was allocated purely as a variable cost. So called "Administration" costs in most cases support business activities and can be allocated to them, thereby shrinking the Administration cost pool. For example, Human Resources costs could be applied between different business activities based on employee numbers. An analysis of the remaining unallocated Administration costs could then be undertaken to determine an appropriate Fixed verses Variable percentage allocation of these costs.

For the high voltage (HV) network capital costs, the current cost allocation is approximately 35% Fixed and 65% Variable. This is based upon the comparison between a single phase overhead line and a three phase overhead line which only occurs primarily in rural areas. In reality, the majority of customers are served by three phase HV lines and cables in urban environments. These three phase systems are the most cost effective solutions for supplying moderate numbers of customers situated in close proximity to one another and therefore a minimum capacity three phase HV line or cable represents the Fixed cost, though it is supplying many customers and the incremental cost to increase the HV line or cable capacity represents the Variable cost. In the example of underground HV cables, presented below, the analysis suggests that a higher Fixed percentage should be applied then the existing allocation. The complete analysis is presented in the spreadsheet supplied with the submission.

Table 2 : Fixed verses Variable Cost Components of the Installed Cost of 22kV Underground Cables

Fixed vs Variable Components of the Installed Cost of 22kV Underground Cables					
	Installed Cable Cost $ per km	% Total Cost	Cable kVA Capacity	Delta kVA	Incremental $/kVA/km
Cost of 22kV U/G (35mm2 Al) Min Size Cable	67545	**79%**	4115		
Variable Cost - Additional Cost to 185mm2	17449	**21%**		5944	2.94
Cost of 22kV U/G (185mm2 Al) Cable	84994		10060		
Based on Western Power Corporation Network Assets Valuation as at 30 June 2004					

The key in the cost allocation process is to work out the cost drivers for the network costs incurred. For a network business, the fundamental question is, does this cost increase with the "size of customer" or is it just a specific or shared customer cost. In this way all costs can be considered to get a more accurate Fixed verses Variable cost allocation.

Using a Fixed 70% and Variable 30% cost allocation for HV Networks, low voltage (LV) Networks and Administration, the proposed network tariffs for the distribution customer groups, using $/customer per annum and $/kVA per annum demand, are shown in Table 3 below. This analysis gives indicative network tariffs for the customer groups, based on the data provided in the 2016/17 Price List Information. The overall network revenue for the proposed network tariffs is the same as for the existing network costs. The full analysis is provided in the spreadsheet supplied with this submission.

Table 3: Proposed Network Tariffs with a Fixed 70% and Variable 30% Cost Allocation

The Proposed Network Tariff Structure (with a Higher Fixed Cost Allocation) in Comparison to the Existing Network Cost Structure (Based upon kVA Demand)							
	Existing Network Costs		***Proposed Network Tariffs***			***% Difference***	
% Allocation to Fixed & Variable	*Existing*	*Existing*	*70%*	*30%*			
	Customer Group (Fixed) $/Cust/yr	Customer Group (Variable) $/kVA/yr	Customer Group (Fixed) $/Cust/yr	Customer Group (Variable) $/kVA/yr		% Difference in Fixed $/Cust/yr	% Difference in Variable $/kVA/yr
Unreads	$ 200.91	$ 300.00	$ 616.29	$ 121.48	Note 1	307%	40%
Streetlights	$ 126.91	$ 178.79	$ 2,595.17	$ 88.45	Note 1	2045%	49%
Residential	$ 261.90	$ 223.33	$ 666.90	$ 110.79		255%	50%
Small Business	$ 367.13	$ 217.86	$ 716.91	$ 107.20		195%	49%
General Business -Small	$ 571.12	$ 215.34	$ 932.72	$ 107.25		163%	50%
General Business -Med	$ 1,072.56	$ 207.14	$ 1,440.75	$ 104.90		134%	51%
General Business-Large	$ 1,452.28	$ 153.53	$ 1,861.11	$ 84.15		128%	55%
LV >1000kVA	$31,200.00	$ 147.02	$ 2,216.29	$ 84.21		7%	57%
HV less that 1000kVA	$ 3,448.28	$ 103.17	$ 3,890.37	$ 42.59		113%	41%
HV > 1000kVA	$72,151.90	$ 52.37	$ 4,239.57	$ 42.75		6%	82%
Average	$ 253.34	$ 196.55	$ 676.86	$ 104.59		267%	53%
	Note 1 : Unreads and Streetlight customer numbers adjusted to give the same network revenue						

Changes to the Fixed/Variable percentage allocation does change cost responsibilities between customer groups, based on their relative customer numbers and kVA demand. For the specialised Unreads and Streetlights customer groups, adjustments were made to their customer numbers to match their current published network costs. This analysis gives indicative network tariffs for the customer groups, based on the data provided in the 2016/17 Price List Information. Due to the aggregated nature of the data, the method of allocating LV network costs and the non-linear methods of calculating costs for customers above 1000 kVA, these proposed network tariffs can only be indicative. A more detailed analysis using Western Power's complete network cost and customer data information is therefore required.

Practically, Western Power is able to restructure its distribution network tariffs fairly easily, because it only sells to retailers. Western Power's revenue requirement would still be met and retailers would still pay substantially the same overall network charges, by charging $/kVA/annum rather than Cents/kWh. There may be some minor differences in individual retailers charges, because of their different customer mixes, but this could be easily phased in if required.

Implementing a $/kVA/annum charge, even without meters that measure kVA demand, is exactly the same as is currently undertaken by AEMO for passing on the generation capacity costs to retailers. For customers without demand metering, the retailer would pay Western Power's $/kVA/annum charge on the basis of the estimated customer group kVA any time maximum demand.

Because these proposed $/kVA/annum rates are based a customer group, rather than a single customer, the individual $/kVA/annum rate that would ultimately apply to individual customers, with smart meters which measure peak kVA, would be slightly different. This information could be gathered by Western Power as it looks to roll out its smart meters with kVA demand measurement.

A much more rigorous examination of the fixed and variable nature of network costs should be undertaken. The final Fixed verses Variable percentages should try to match the overall weighting of Western Power's assets underground/overhead and urban/country distribution assets and the operational expenditure. This could then be applied to Western Power's complete network cost data and with more detailed customer information, the final customer group network tariffs could be determined. This would then form the basis to determine the published Reference Tariffs.

4. Comments on New Time of Use and Demand Tariffs and the Need to Reduce the Number of Network Tariffs

Western Power's role is to charge retailers network tariffs that match as closely as possible the way in which network costs are incurred. Western Power's network tariffs should be "blind" to technology behind the meter and "blind" to customer type, where there are no real quantifiable network cost differences. Western Power should not have the role of creating a multitude of network tariffs for the customer to choose from because it has a protected regulated revenue, even if its network tariffs do not match their costs. The retailer can create multiple tariffs as long as they are prepared to take the revenue risk if their tariffs do not fully match its costs.

Western Power should not be introducing new network tariffs, such as its proposed new time of use energy (RT17 and RT18) and time of use demand (RT18 and RT19) tariffs, because they rely heavily on kWh energy rates and there is no network cost difference between them and the existing residential and small business network tariffs. Western Power should be trying to reduce the number of distribution network tariffs and focusing on eliminating kWh energy based tariffs and replacing them with $/kVA demand tariffs.

Western Power needs to charge retailers $/kVA/annum demand rates, even for network customers without demand metering, by basing their charges on the customer group ATMDs. This signals to the electricity retailer the cost drivers of the Western Power network. Electricity retailers can then begin to inform their customers of these network cost drivers through the retail tariffs.

Offering multiple choices of tariff could only be acceptable if Western Power is prepared to wear the revenue risk of its tariffs. The revenue risk of settings tariffs that do not reflect Western Power's cost structures should not be borne by electricity retailers.

Under the Electricity Networks Access Code, customers of less than 1000 kVA demand are treated uniformly. Ultimately this could lead to these customers having a single network tariff for LV connection and a single network tariff for HV connection, with tiered $/kVA/annum demand charges, only differentiated by the level of assets and services utilised across the range in customer demand and the difference in network peak demand losses.

In moving towards cost reflective $/kVA/annum network tariffs, consideration needs to be given the most appropriate way in which a $/kVA demand charge would be implemented for customers with demand metering. The $/kVA demand charge could be based on the maximum customer kVA recorded any time over 1 year or during each month. This is already discussion of these issues in Western Power's Price List Information. Monthly kVA demand rate could have a seasonal variation to signal the marginal cost of increased demand between seasons. Monthly kVA demand could also only apply during particular peak network demand times such as during weekdays between 3pm and 9pm. There are many possibilities which need exploring.

5. Western Power Becoming More Financially Responsible for Its Network Tariff Pricing Structures

Western Power should take responsibility for the impact its kWh network tariffs have on electricity retailers and retail electricity customers. Any additional costs imposed on electricity retailers, because the kWh based network tariffs do not reflect the network costs, should be deducted from Western Power's approved revenue and rebated back to the electricity retailer.

In the case of retail residential customers installing Solar PV and reducing their network metered kWh consumption, because of Western Power's regulated revenue status, the loss in its network revenue was recouped by increasing the network tariff kWh rate. Western Power's revenue loss should not have been recouped by increasing the kWh tariff rate charged to electricity retailers. As the revenue loss resulted from using the inappropriate kWh tariff structure instead of a kVA tariff structure, Western Power should have borne the revenue loss.

The reduction in consumption caused by the installation of Solar PV should have resulted in electricity retailers' overall network charges falling by an estimated $50m as shown in Table 4. This amount should be rebated back to the electricity retailers. The data for this analysis is shown in the spreadsheet provided with the submission.

Table 4: Estimated Solar PV Impact on Network Metered kWh for 2016/17

Estimated Solar PV Impact on Network Metered kWh for 2016/17	**Customers**	**Ave Network Metered kWh/Cust**	**Network Metered kWh**	**Ave Metered kWh Reduction of Customer with Solar PV**	**Assumed PV Load Factor for Avoided Metered kWh**	**Calculated Ave Solar kW/Cust**
Residential Total No Solar (2009/10 kWh/Cust x 2016/17 Cust Nos)	**1013751**	**6041**	6124069791			
Residential Total With Solar (2015/16 kWh/Cust x 2016/17 Cust Nos)	**1013751**	***5478***	5553327978			
Difference = Theoretical Solar Production	**181467**		570741813	3145.15	**11%**	**3.26**
(Note 2015/16 kWh/Cust used as 2016/17 kWh/Cust seems too low)				*(This appears reasonable given*		
				typical PV Total Load Factor above 20%)		
		Cents/kWh	**kWh**	**$M /Annum**		
Loss of Network Revenue from Customers Taking Up Solar		**8.744**	570741813	**49.91**		

This lack of network tariff cost reflectivity should be an additional factor to be included in the development of Western Power's approved revenue and should be rebated to electricity retailers through lower charges for the affected network tariffs . This might also be a strong motivator for Western Power to adjust its network tariffs to be more cost-reflective.

Conclusions and Recommendations

The case for cost reflective network tariffs with Fixed $/customer/annum and Variable $/kVA/annum rates has been presented. The current kWh energy based network tariffs using Cents/kWh rates have been shown not to meet the Electricity Network Access Code's primary objective (Section 2.1) and Section 7.4(a) of its pricing methods chapter. By not charging on a $/kVA/annum basis, Western Power is not meeting its own Network Efficiency Objective.

Western Power's role is to charge electricity retailers network tariffs that match, as closely as possible, the way the network costs are incurred. Western Power's network tariffs need to be recast using the cost reflective pricing structure of $/customer/annum (fixed component) and $/kVA/annum (variable component). The network tariffs can be determined from the network cost structure once the relative Fixed verses Variable cost allocation is determined,. These replacement network tariffs could be applied easily and immediately at the distribution level with electricity retailers, based upon estimated customer group any time maximum demands.

Western Power's network tariffs should be "blind" to technology behind the meter and "blind" to customer type, where there are no real quantifiable network cost differences. This would lead to a reduction in the number of distribution network tariffs, rather than a proliferation of them.

Under the Network Access Code, customers of less than 1000 kVA demand are treated uniformly. Ultimately this could lead to these customers having a single network tariff for LV connection and a single network tariff for HV connection, both with tiered $/kVA/annum demand charges, only differentiated by the level of assets and services utilised across the range in customer demands and the difference in network peak demand losses.

Western Power should take responsibility for the impact its kWh network tariffs have on electricity retailers and the retail electricity customers. Any additional costs imposed on electricity retailers, because the kWh based network tariffs do not reflect the network costs, should be deducted from Western Power's approved revenue, and rebated back to the electricity retailer. This would be a strong motivator for Western Power to adjust its network tariffs to be more cost-reflective with Fixed $/customer/annum and Variable $/kVA/annum rates .